# Commercial Harbor Craft
# Proposed Regulation Workshop

**Sacramento**

**February 16, 2006**

**California Environmental Protection Agency**

Air Resources Board

## Overview

- Vessel numbers and emissions
- Background information
- Regulatory concepts
- Costs
- Regulation timeline
- Other issues

# Harbor Craft Emission Reductions Key to Multiple Plans

- Diesel Risk Reduction Plan
- Goods Movement Plan
  - Harbor craft goals:
    - 2010 -25% reduction
    - 2015 -30% reduction
    - 2020 -40% reduction
- San Pedro Bay Port Clean Air Action Plan
  - Third largest emissions impact after ocean going vessels and cargo handling equipment
- State Implementation Plan (SIP)

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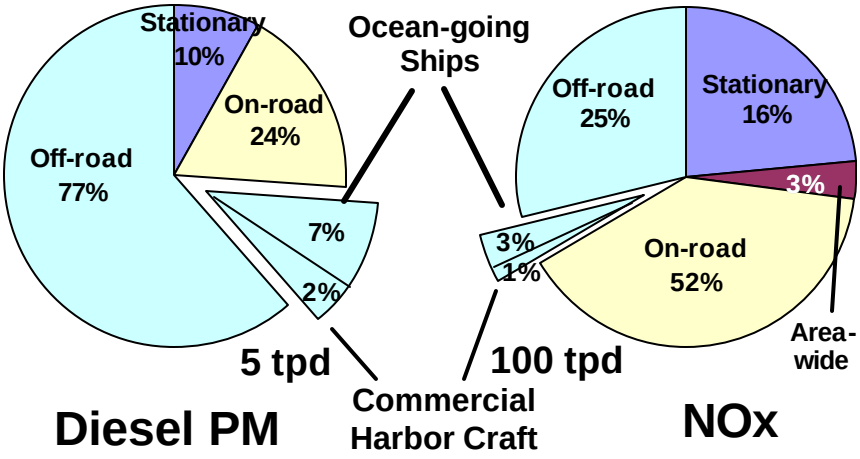
# Estimated Harbor Craft Emissions Impact




2005 CARB Almanac and On-Line Inventory

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# Harbor Craft Vessel & Engine Quantities

| Vessel Type | Number of Vessels | Number of Engines | | Average Horsepower of Engines | |
|---|---|---|---|---|---|
| | | Propulsion | Auxiliary | Propulsion | Auxiliary |
| F/T/T Sub-Total/Average | 579 | 1156 | 757 | 853 | 97 |
| WCPO Sub-Total/Average | 316 | 487 | 166 | 279 | 40 |
| Non-Fishing Total/Average | 895 | 1643 | 923 | 558 | 82 |
| Fishing Vessel Total | 3290 | 4050 | 1696 | 310 | 62 |
| Total/Average All Commercial Harbor Craft | 4185 | 5693 | 2619 | 503 | 78 |

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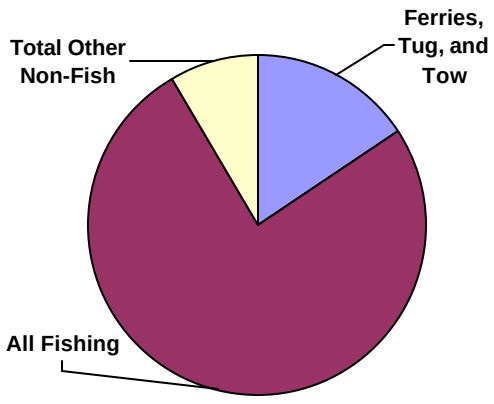
# Harbor Craft Main and Auxiliary Engine Inventory

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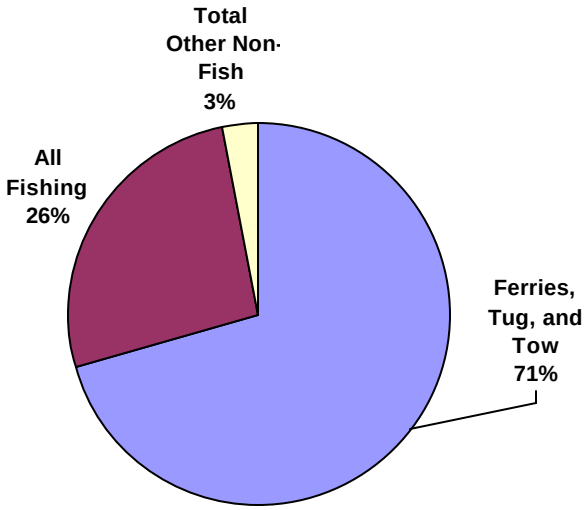
# Diesel PM and NOx Emission Sources

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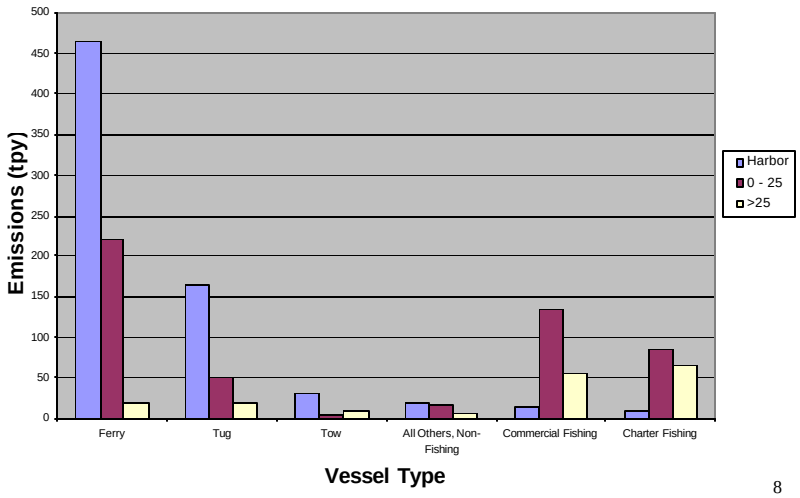
# PM Emissions and Proximity to Shore

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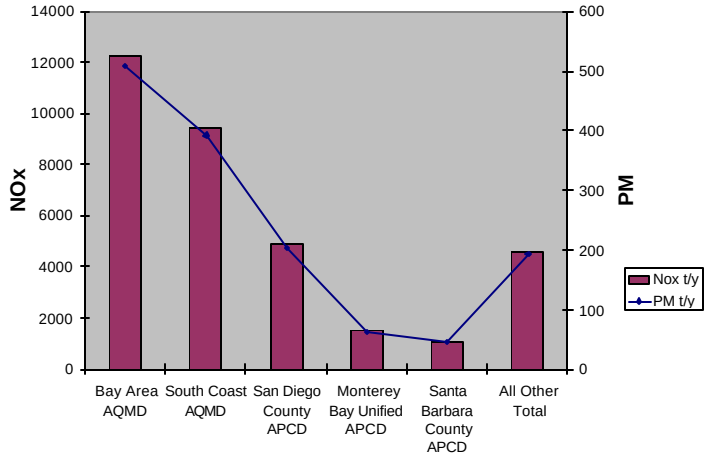
# Emissions By Air District
(tons/year)

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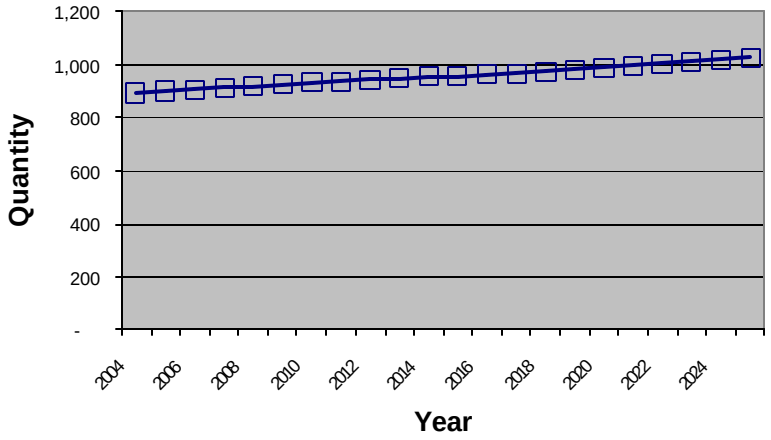
# Non-Fishing Steady

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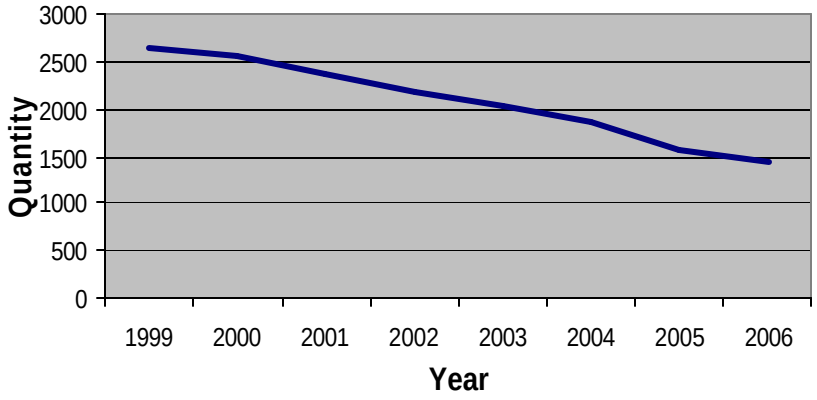
# Fishing Vessel Declining

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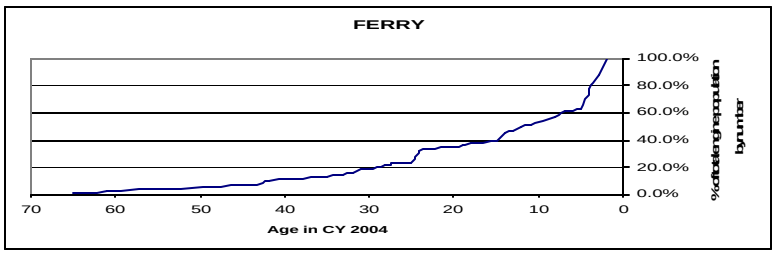
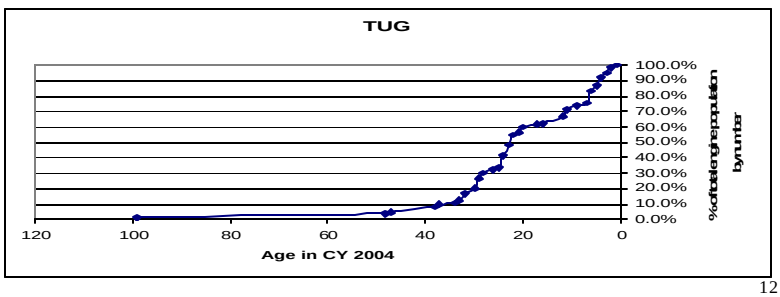
# Engine Age Distribution for Ferries and Tugs

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# Estimated Fleet Sizes

- Ferry
  - 8 or more vessels 40%
  - 4-7 vessels 20%
  - 2-3 vessels 15%
  - Single vessel owners 25%
- Tug/Tow
  - 8 or more vessels 55%
  - 4-7 vessels 20%
  - 2-3 vessels 20%
  - Single vessel owners 5%

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# Questions

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# U.S. EPA Marine Engine Standards

- Tier 0 Engines are unregulated (<2004)
  - Majority of the commercial harbor craft engines
- U.S. EPA has established Tiered Standards
  - Tier I (2004)
  - Tier II (2004-2007)
    - Vary by engine displacement and model year
- Tier III are not yet promulgated

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# Approximate Emission Reductions for Engine Repowers

| U.S. EPA Marine Tier | U.S. EPA Marine Tier | NOx Reductions | PM Reductions |
|---|---|---|---|
| Tier 0 | Tier I | 40 % | 25 % |
| **Tier 0** | **Tier II** | **60 %** | **65 %** |
| Tier 0 | Tier III* | 70 % | 80 % |
| Tier I | Tier II | 40 % | 50 % |

*ARB estimate

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# CARB Fuel Standard for Harbor Craft

- 15 ppm CARB low sulfur diesel fuel required for all harbor craft starting January 1, 2007
- Sold in South Coast District AQMD starting January 1, 2006.
- Sold statewide starting September 1, 2006.
- Reduction of
  - NOx 0.2 tons per day
  - SOx 1.5 tons per day
  - PM 0.5 tons per day

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# Additional Options to Reduce Emissions

- Repower engines to Tier II
- Diesel emission control retrofits
  - Currently no CARB verified strategies

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# Diesel Emission Control Retrofits for Harbor Craft

- No verified marine retrofits
- Blue and Gold Ferry Demonstration
  - Installing PM traps on main engines
  - Successful PM traps on aux. engines
- Navy Workboat Demonstration
  - Successful low emission engine rebuild and retrofit PM trap.
- Continue to work with vessel owners to get retrofits installed and tested.

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# Questions

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# Regulatory Approach

- Ferries, tugs, and tow vessels
  - Control largest emission source first
  - Rationale:
    - ~70 % of NOx and ~70 % of PM total harbor craft emissions
    - High near shore emissions
- All other harbor craft
  - Initial reporting and recordkeeping
  - Rationale:
    - Work further from shore
    - Declining commercial fishing fleet
  - Address emission reductions at a later date

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# All New Harbor Craft Vessels

- Require most current EPA engine
  - Sell through provisions
  - Most current engine available when vessel is designed.

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## All New Ferries

- Require most current EPA engine + combined PM and NOx reduction of 85%

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## In-Use Requirements for All Vessels

- Install non-resettable hour meter
- Reporting and recordkeeping requirements

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## In-Use Vessels Other Than Ferries, Tugs, and Tow

- Crew and supply boats
- Pilot boats
- Work boats
- Charter fishing vessels
- Commercial fishing vessels
- Other vessels

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## Reporting and Recordkeeping Opportunities

- Recordkeeping and reporting requirements possibly starting 2008
- Retain opportunity for Carl Moyer and other funds.
  - Reporting and recordkeeping may be required to receive certain funds.
  - Additional PM, NOx, and other emission reductions.
- Regulatory action possible in future

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## Phased Engine Replacement for In-Use Ferries, Tugs, and Tow

- Phase in schedule oldest high use engines first
- Additional time for fleets with multiple vessels.
- Investigating allowing engine replacement to coincide with rebuild schedule.

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## In-Use Compliance Options for Ferries, Tugs, and Tow

- Repower vessel engine certified to meet the current U.S. EPA Marine Emission Standards.
- Demonstrate the current engine meets the current U.S. EPA Marine Emission Standard
- ***Possible retrofit option***

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## Alternative Compliance Plan

- Only harbor craft under direct control of the owner/operator per port
- Operators may comply using alterative emission control strategies.
- Must achieve equivalent or greater reductions
- Applications include a public review process

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## Regulatory Extensions with ARB Approval

- Vessel near retirement
- Use of a non-verified emission control strategy
- Changes in hours of operation, sales, and change of ownership.
- No suitable engine replacement.

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# Exempt Harbor Craft

- Low use <300 hour annual use
- Non-profit research vessels
- Temporary emergency rescue and recovery vessels.
- Registered historic vessels
- Military tactical support vessels
- Ocean-going and recreation vessels
- Engines using alternative fuels exclusively

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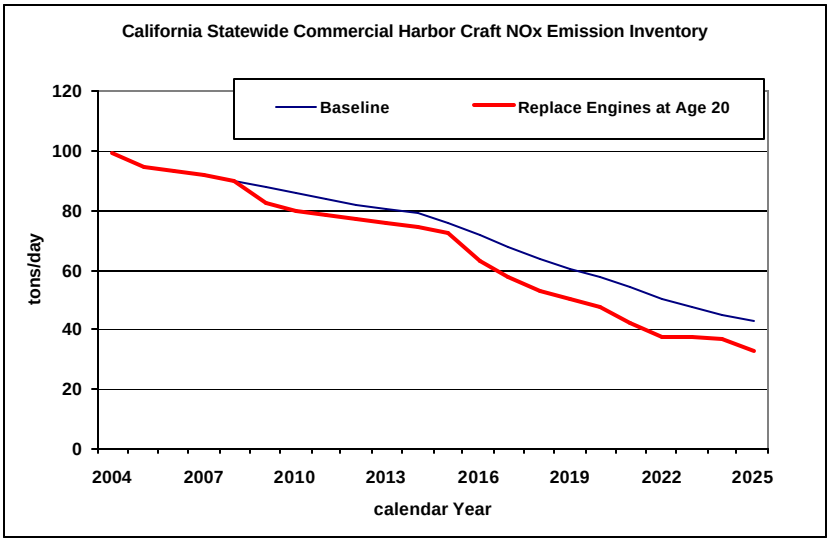
# Estimated Emission Reductions



## Questions

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## New Vessel
## Tug and Ferry Cost

- Ferry
  - 8 million+ per vessel
- Tug / Tow
  - 5 million per vessel

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## Ferry Engine Repower Estimated Cost

- 2 Main / 1 Auxiliary Engine
  - $400K – based on $250/hp
  - $3,400/ton NOx and $40/lb of PM
  - $3,600 Carl Moyer cost effectiveness calculation

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## Tug Engine Repower Estimated Cost

- 2 Main / 1 Auxiliary Engine
  - $670K – based on $250/hp
  - $3,700/ton NOx and $50/lb of PM
  - $4,200 Carl Moyer cost effectiveness calculation

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## Estimated Total Cost

- Replace all Ferry, Tug/Tow with Tier II engines
  - About $200 million
  - About 1600 engines at $250/hp

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## Other Factors Impacting Repower

- Obtaining dry dock time
- Sufficient engine installer capacity
- Design time
- Lead time for engine delivery
- Coast Guard approval
- Lost service time

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## Questions

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## Regulation Timeline

- Mid to late March 2007- Next workshop
- May 2007 - Release Initial Statement of Reasons
  - Start 45 day comment period
- July 2007 - Present to Board for consideration

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# Outstanding Issues

- Vessels visiting CA
- Overlap with other regulations and ATCMs
- Compliance timelines
- Alternatives to meet emission reduction goals
- Useful economic life

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# Questions